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Comparison of Micronaire Readings and Arealometer Values



Prepared in the
Field Crops Research Branch
Beltsville, Maryland

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Comparison of Micronaire Readings and Arealometer Values

To facilitate estimating Micronaire readings that would correspond with the Arealometer values given in the progress reports on the annual varietal and environmental studies of fiber and spinning properties of cotton, the attached table has been prepared.

The Arealometer and Micronaire (linear scale) values in this table were derived from the regression equation expressing the relationship between these two fineness measurements. The regression equation between the two measurements was calculated from repeated determinations on 312 samples representing eight Upland varieties grown at thirteen locations over a three-year period. The regression equation obtained was: Arealometer (A) = $738.1 - 66.9345 \times$ Micronaire (linear). The correlation obtained between the two fineness measurements was $-.94$.

This study was part of a cooperative project between the Cotton Section, Crops Research, and the Southern Regional Research Laboratory, Utilization Research, of the Agricultural Research Service, U. S. Department of Agriculture.

At the present time the curvilinear scale has replaced the linear scale in most laboratories using the Micronaire. Thus, if no mention is made as to the scale used, it may be assumed that the data were obtained on the curvilinear scale. The equation for converting Micronaire (linear scale) to Micronaire (curvilinear scale) is given in a preliminary report (processed) by the Cotton Branch, Production and Marketing Administration, entitled "Revised Micronaire Fiber-Fineness Scale for use in Testing American Upland Cottons, October 1950." The equation given is: Micronaire (curvilinear) = $2.314 + .0413X + .101X^2$ where X = Micronaire reading (linear scale).

The curvilinear values in this table do not apply to American-Egyptian cottons. According to a processed report, "Micronaire Fiber-Fineness Scale for use in Testing American-Egyptian Cotton, January 1952," by the Cotton Branch, Production and Marketing Administration, Micronaire (curvilinear) values for American-Egyptian cottons may be calculated from the equation: Micronaire (curvilinear) = $1.514 + .0413X + .101X^2$ where X = Micronaire reading (linear scale) as before.

Weight per inch as determined by the Causticaire method is based on an entirely different principle from that of the Micronaire and the relationship of Arealometer to Causticaire is not included in the accompanying table. In work now being carried out by the Cotton Division, Agricultural Marketing Service, the Causticaire method for determining fineness has largely replaced the Micronaire. A report on the Causticaire method (Marketing Research Report No. 57, December 1953) has been published by the Cotton Division, Agricultural Marketing Service.

Table of Estimated Micronaire Readings
and Corresponding Arealometer Values

Micronaire reading		Arealometer value	Micronaire reading		Arealometer value
linear scale	curvi-linear scale	(A)	linear scale	curvi-linear scale	(A)
2.10	2.85	593	4.60	4.64	430
2.20	2.89	591	4.70	4.74	424
2.30	2.94	584	4.80	4.84	417
2.40	2.99	577	4.90	4.94	410
2.50	3.05	571	5.00	5.05	403
2.60	3.10	564	5.10	5.15	397
2.70	3.16	557	5.20	5.26	390
2.80	3.22	551	5.30	5.37	383
2.90	3.28	544	5.40	5.48	377
3.00	3.35	537	5.50	5.60	370
3.10	3.41	531	5.60	5.71	363
3.20	3.48	524	5.70	5.83	357
3.30	3.55	517	5.80	5.95	350
3.40	3.62	511	5.90	6.07	343
3.50	3.70	504	6.00	6.20	336
3.60	3.77	497	6.10	6.32	330
3.70	3.85	490	6.20	6.45	323
3.80	3.93	484	6.30	6.58	316
3.90	4.01	477	6.40	6.72	310
4.00	4.10	470	6.50	6.85	303
4.10	4.18	464	6.60	6.99	296
4.20	4.27	457	6.70	7.12	290
4.30	4.36	450	6.80	7.26	283
4.40	4.45	444	6.90	7.41	276
4.50	4.55	437	7.00	7.55	270

